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# Three Vis-Sim Project Postmortems

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# Three Vis-Sim Project Postmortems

Perry McDowell  
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The MOVES Institute

# Poorly Named Title



# Three Projects

- Back to Basics
  - Single player game for counter-piracy training for PCOs at Surface Warfare Officer's School
- Damage Visualization
  - Graphical visualization of Monte Carlo simulations of weapons damage for NSWC Code 566
- Evaluation of game based shiphandling simulation
  - Can a COTS shiphandling game be used to train novice shiphandlers?

# Back to Basics



# Back to Basics



**BACK TO BASICS**  
SCENARIO EDITOR

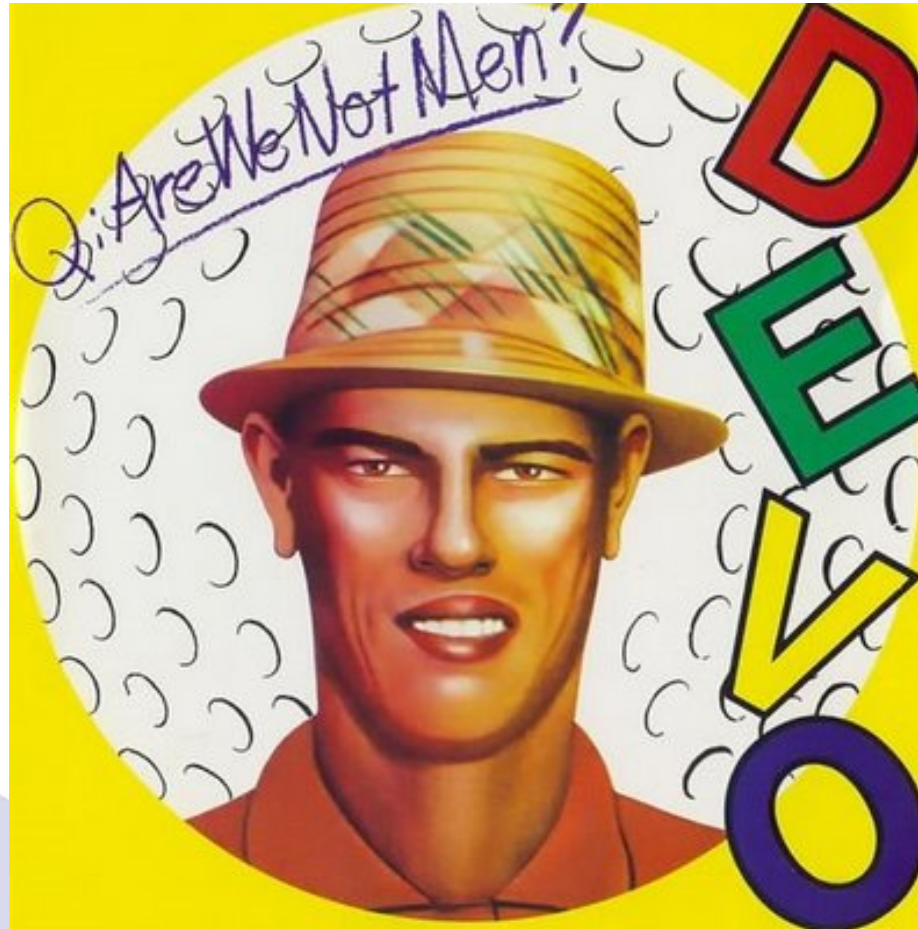
## Takeaway

**Customization is key  
to meeting the  
customer's needs**

*Back to Basics will be demonstrated tonight in Wa-275/285*



# Damage Visualization



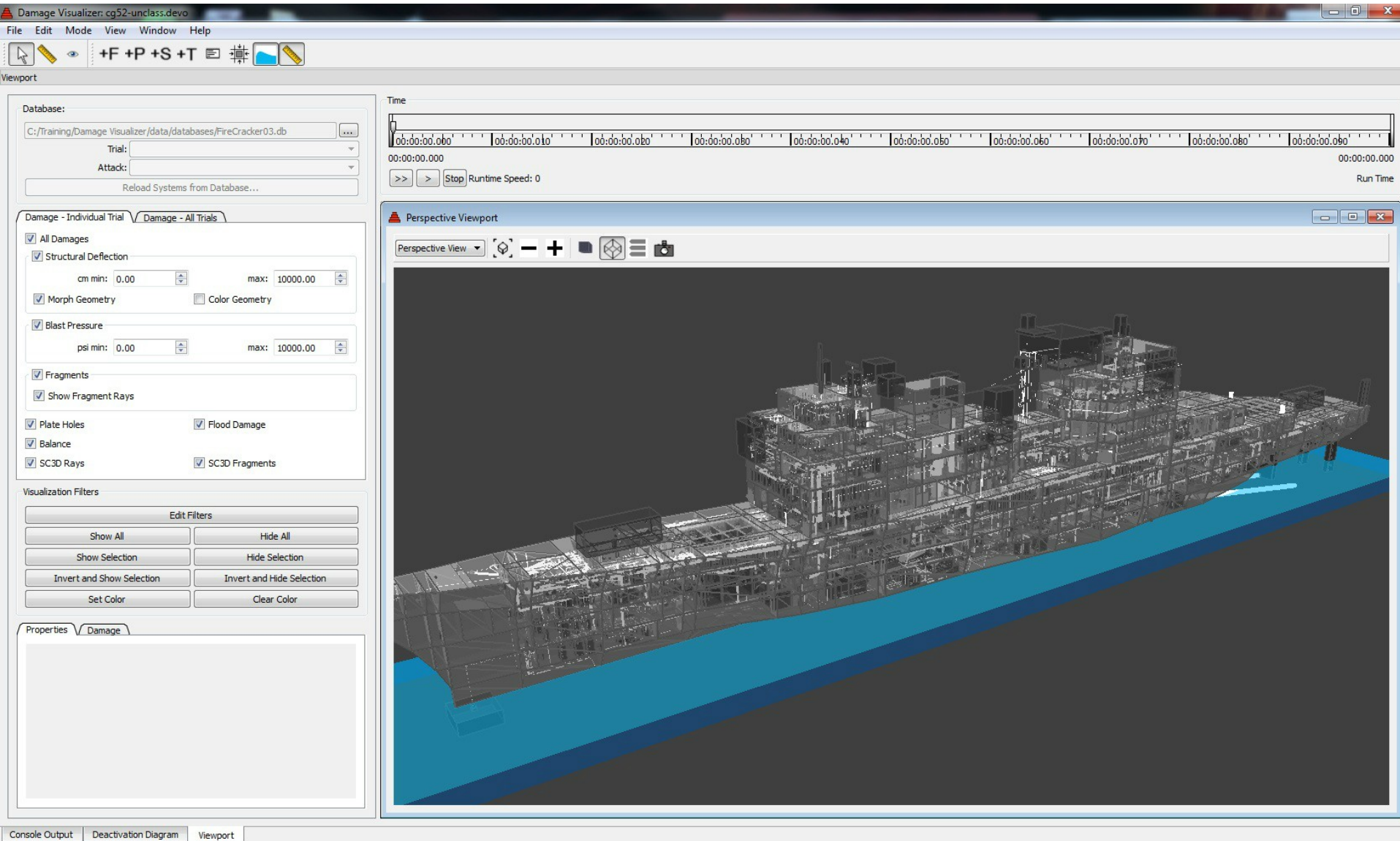


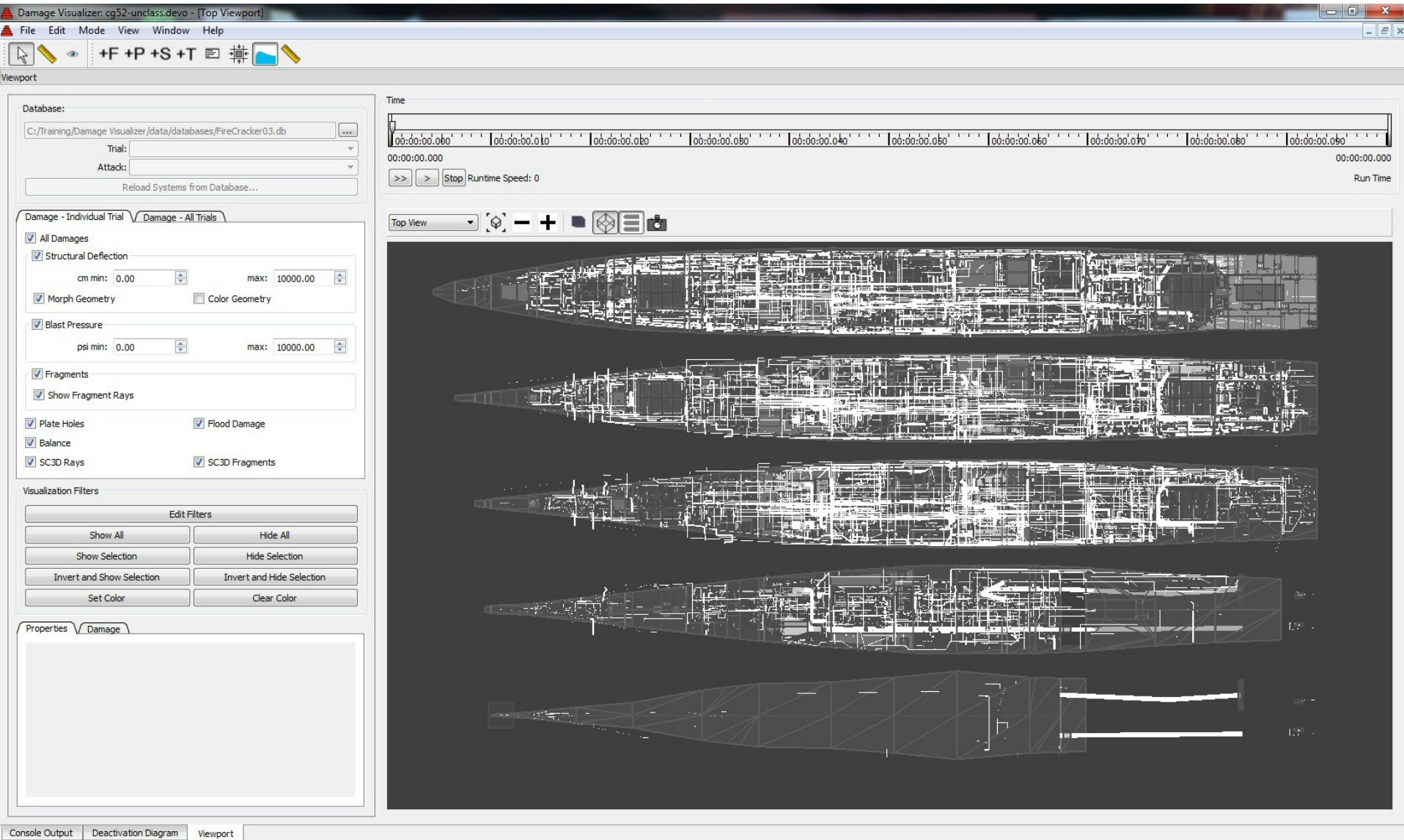
# DEVO

- NSWCC Carderock Code 665 - Vulnerability Assessment determines weapon's damage upon ships
  - Both blue on red and red on blue
  - Use a physics based Monte Carlo simulation
    - Advanced Survival Assessment Program (ASAP)

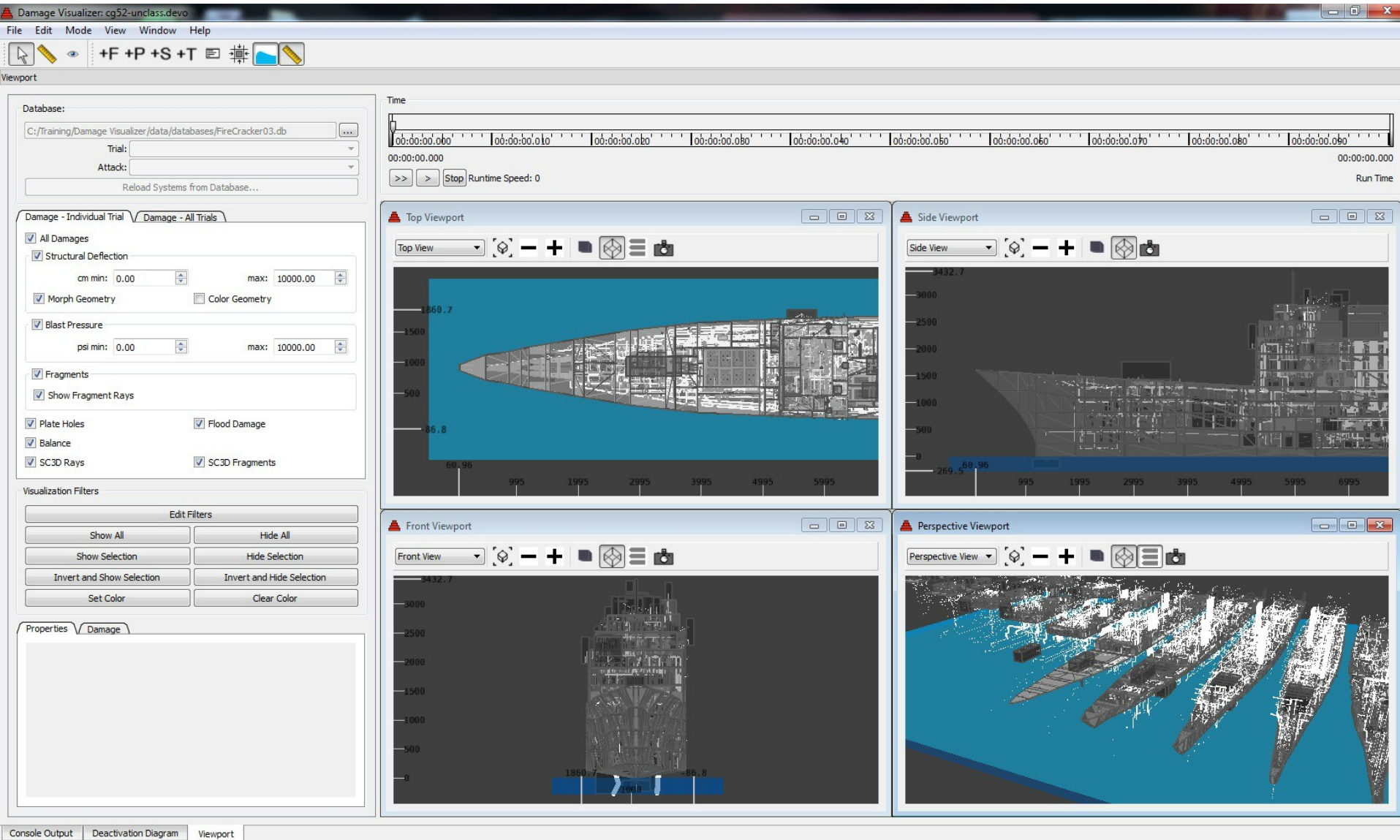
Edward Tufte

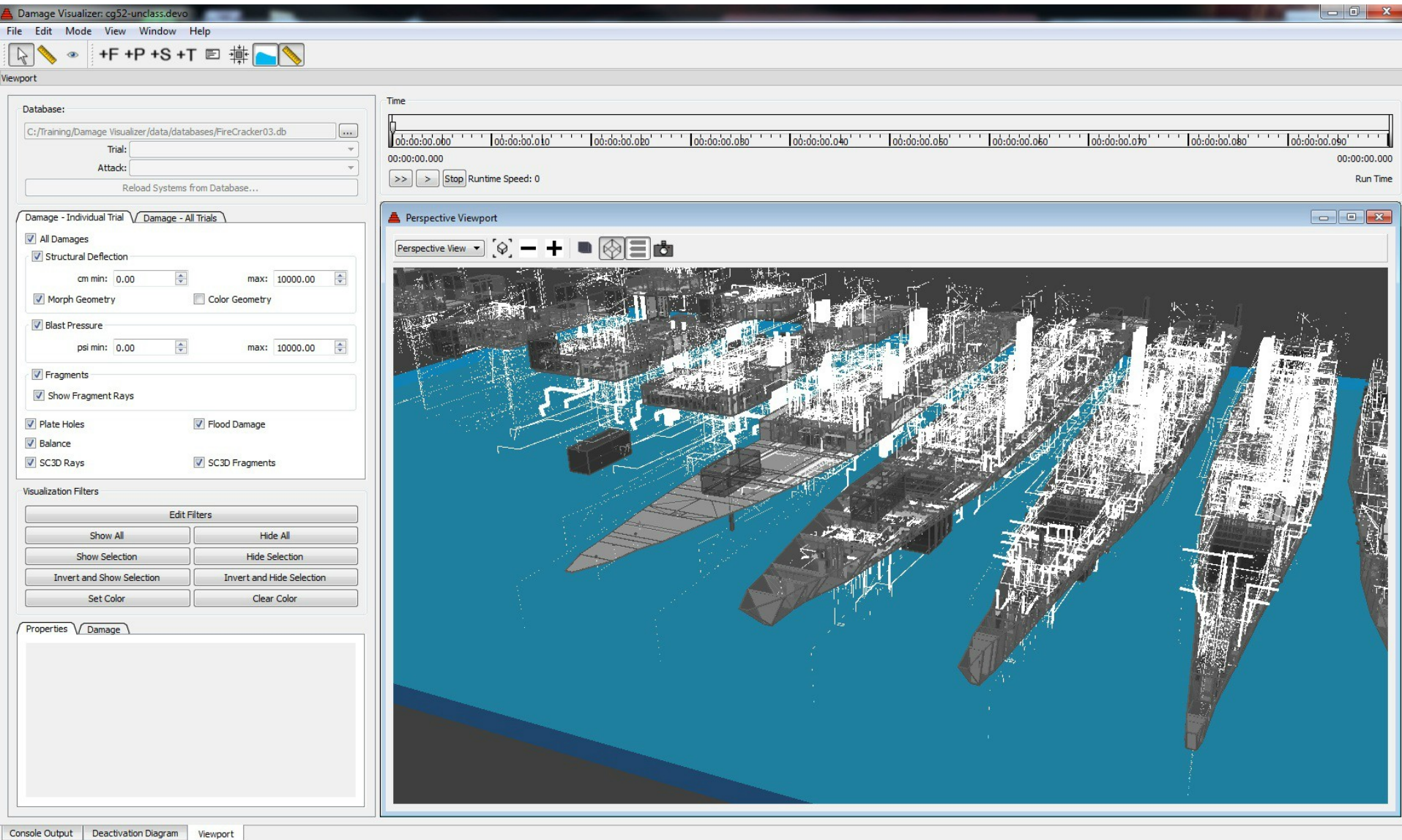
***“I think it is important for software to avoid imposing a cognitive style on workers and their work.”***



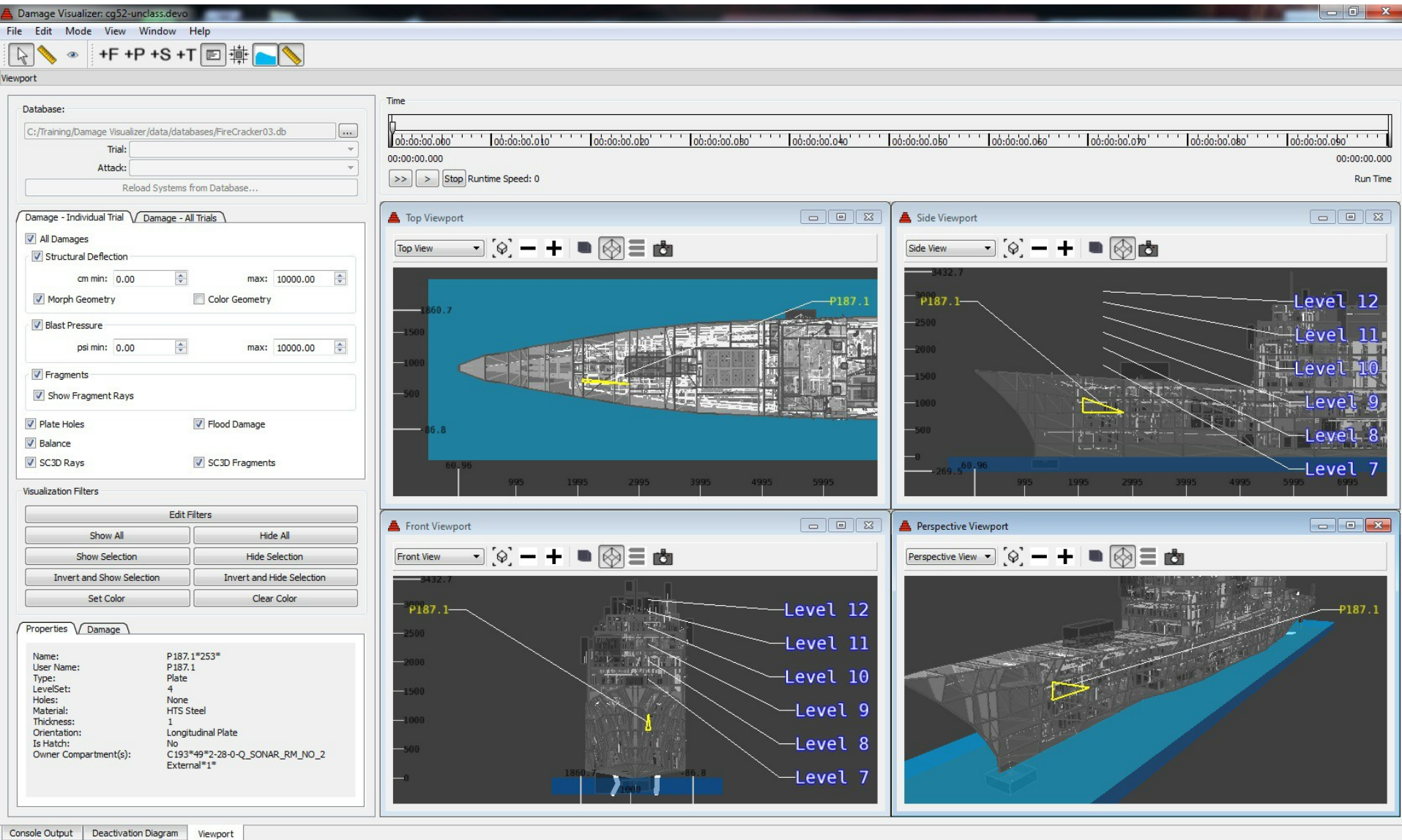


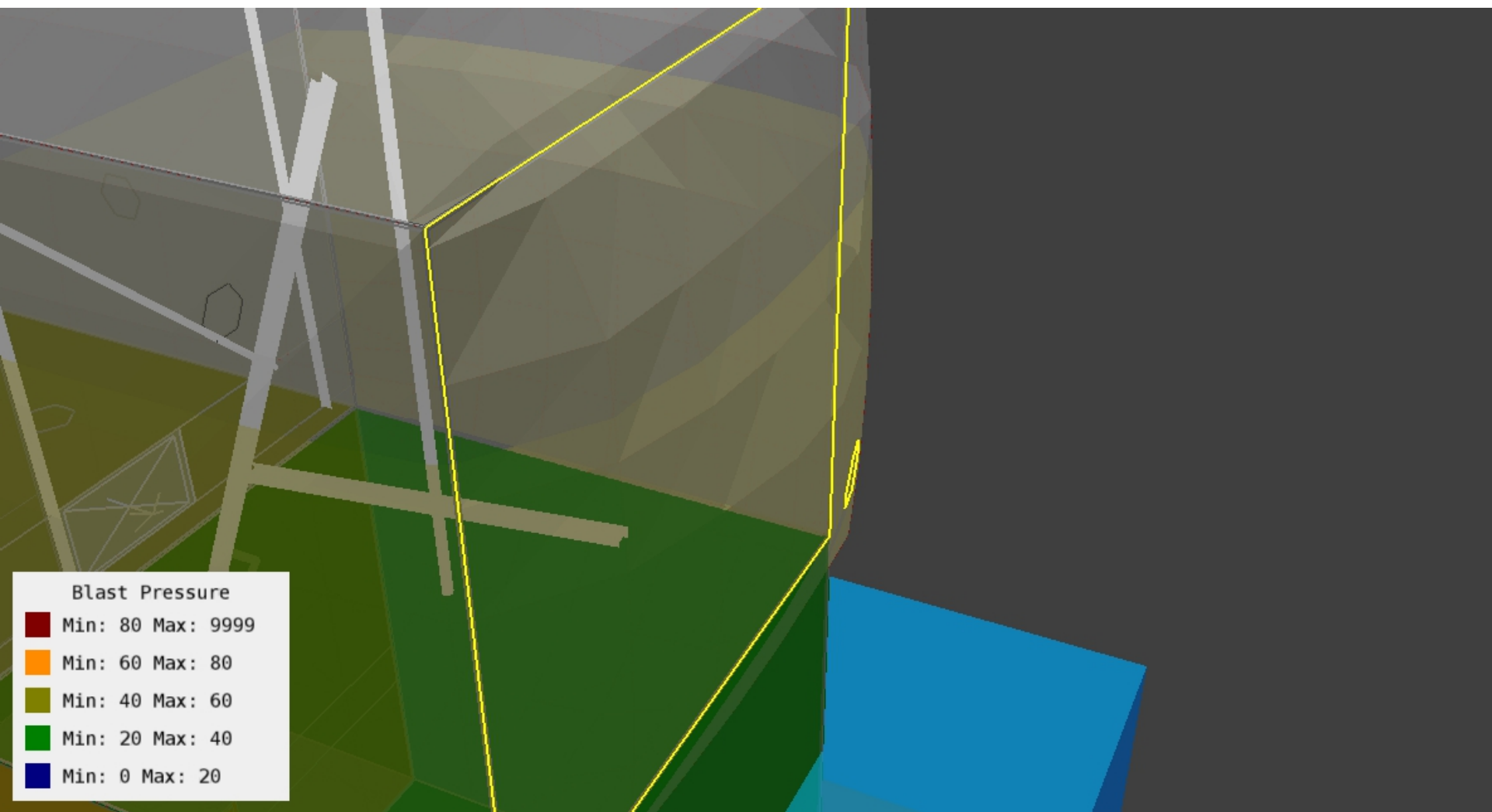


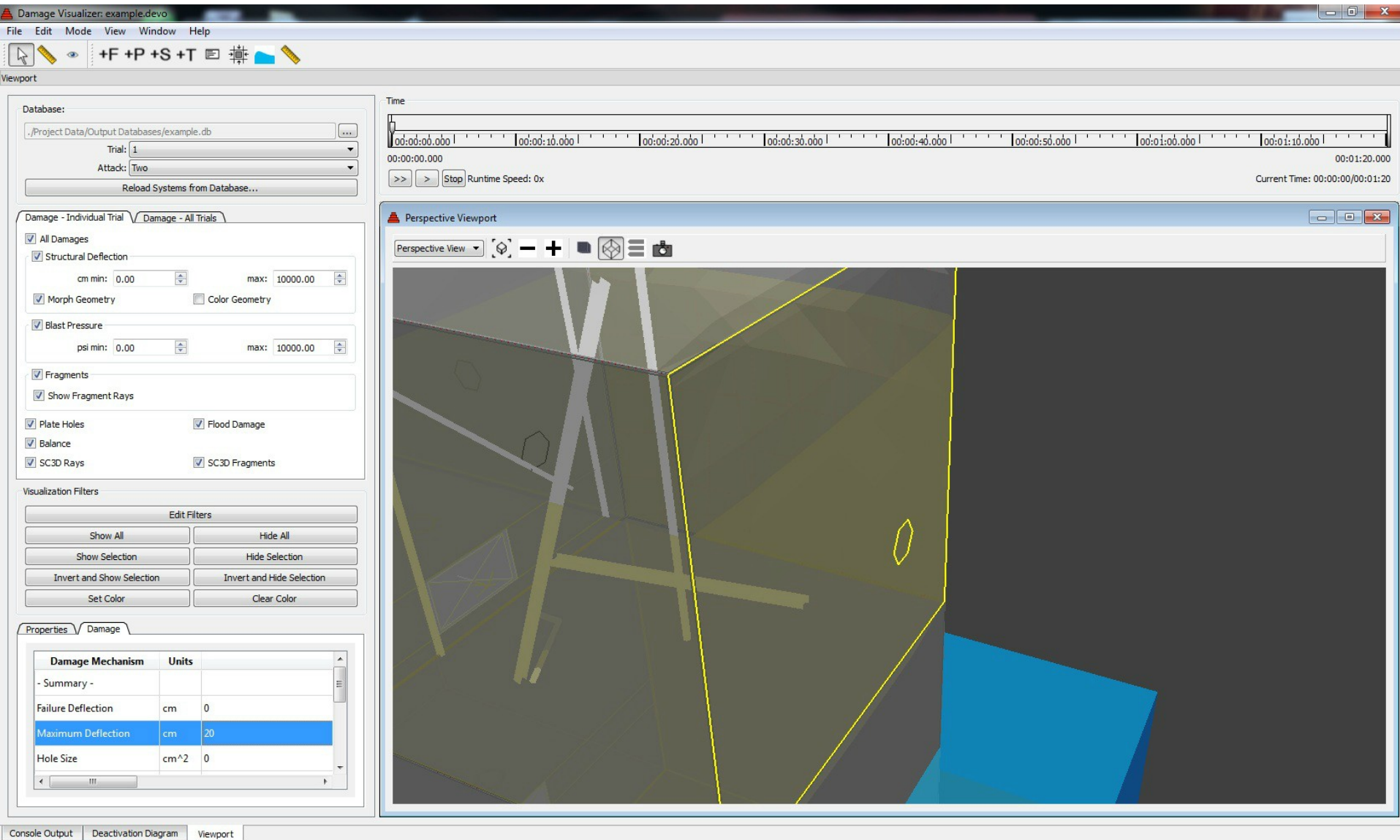


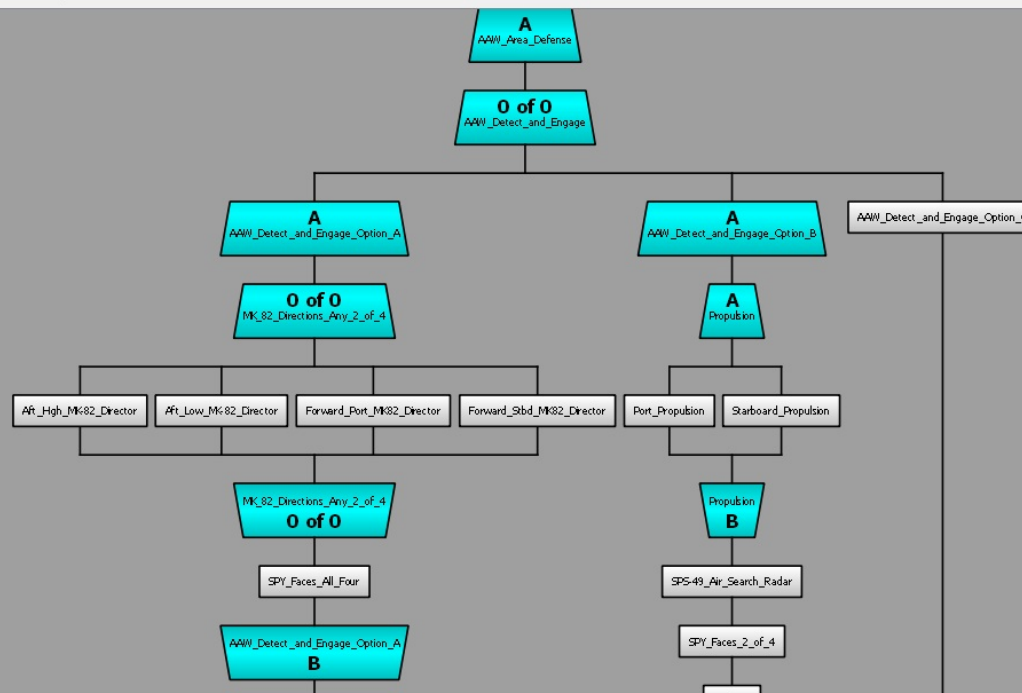












- ▷ AC\_Chilled\_Water
- ▷ Aft\_Low\_MK-82\_Director
- ▷ Forward\_Port\_MK82\_Director
- ▷ Forward\_Stbd\_MK82\_Director
- ▷ SPY\_Faces\_All\_Four
- ▲ AAW\_Detect\_and\_Engage\_Option\_B
  - ▲ Propulsion
    - ▷ Port\_Propulsion
    - ▷ Starboard\_Propulsion
  - ▷ SPS-49\_Air\_Search\_Radar
  - ▷ SPY\_Faces\_2\_of\_4
  - ▷ Steering
- ▷ AAW\_Detect\_and\_Engage\_Option\_C

Richard Hamming

***“The purpose of  
computing is insight,  
not numbers.”***

## Takeaway

**Gaming tools can be used to  
cheaply create traditional  
visual simulations, even  
those outside of simulators**

*DEVO will be demonstrated tonight in Wa-211*



# Shiphandling Trainer

- Two thesis students, LTs Ethan Reber and Ben Bernard, used a COTS game to train novice ensigns in shiphandling at SWOS





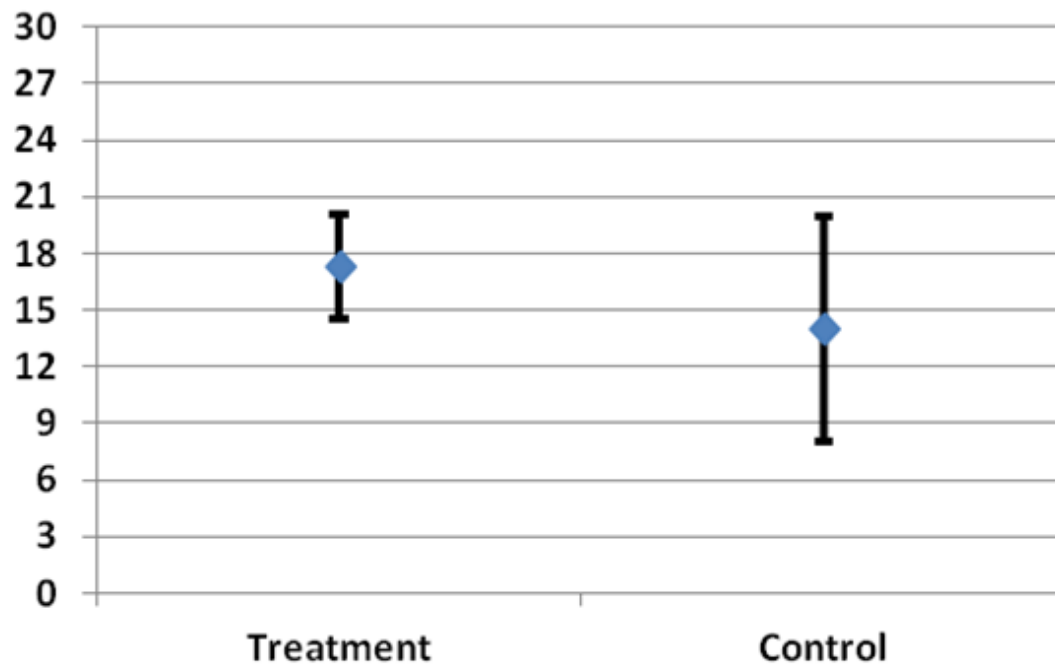
# Ship Simulator Extreme



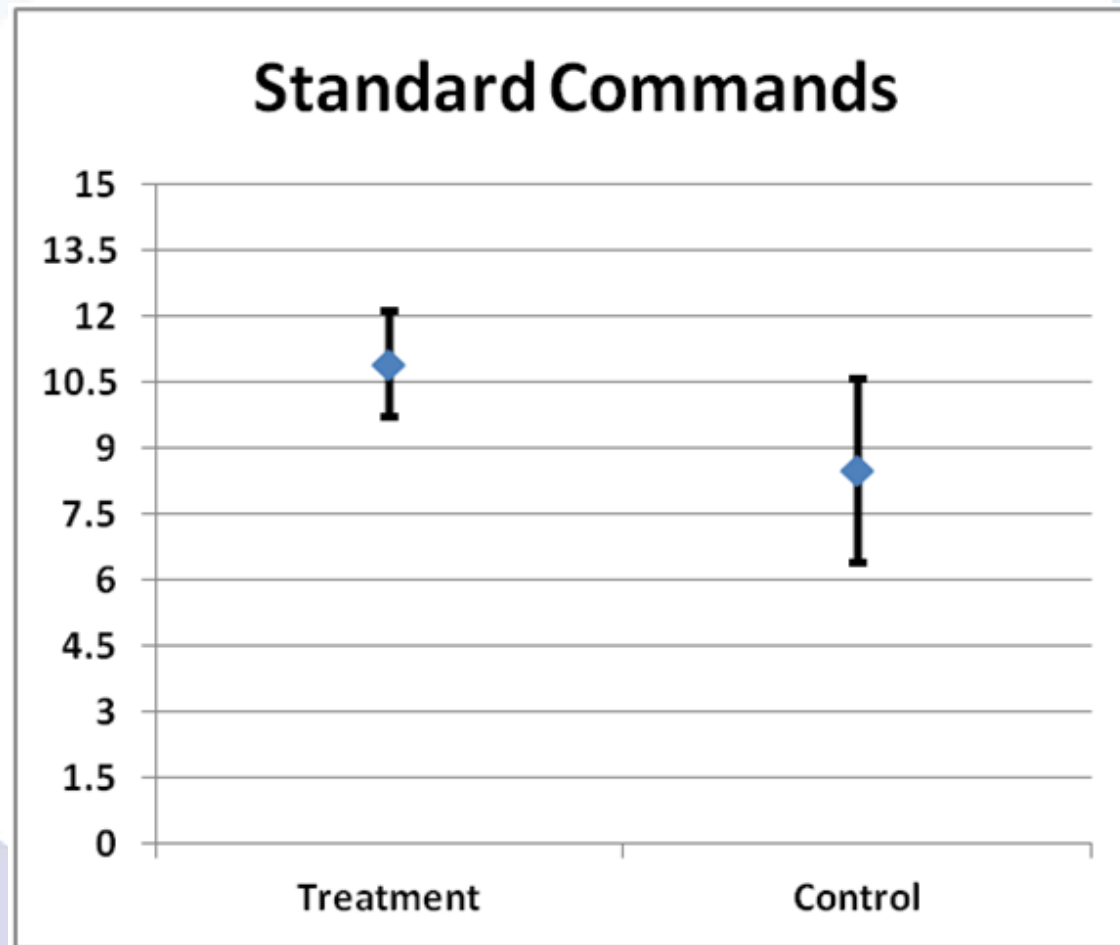
# Shiphandling Trainer Results

	<i>Margins of Safety Maintained</i>		<i>Use of Rudder, Propulsion, and Tugs</i>		<i>Anticipates and Evaluates Ship Responsiveness</i>		<i>Standard Commands</i>		<i>Aggregate Maneuver</i>	
<b>Test Mean</b>										
<i>Hypothesized Value</i>	14		45		16		8.5		167	
<i>Actual Estimate</i>	17.2727		45.4545		11.8182		10.9091		170.909	
<i>DF</i>	10		10		10		10		10	
<i>Std Dev</i>	4.67099		10.113		4.0452		2.0226		25.0817	
<i>Sigma given</i>	9.66		15.81		8.43		3.37		74.54	
	z Test	Signed-Rank	z Test	Signed-Rank	z Test	Signed-Rank	z Test	Signed-Rank	z Test	Signed-Rank
<i>Test Statistic</i>	1.1236	27	0.0954	12	-1.6453	-30	2.3709	33	0.1739	9
<i>Prob &gt;  z </i>	0.2612	0.0078*	0.924	0.3408	0.0999	0.0039*	0.0177*	0.0010*	0.8619	0.4551
<i>Prob &gt; z</i>	0.1306	0.0039*	0.462	0.1704	0.95	0.998	0.0089*	0.0005*	0.431	0.2275
<i>Prob &lt; z</i>	0.8694	0.9961	0.538	0.8296	0.0500*	0.0020*	0.9911	0.9995	0.569	0.7725

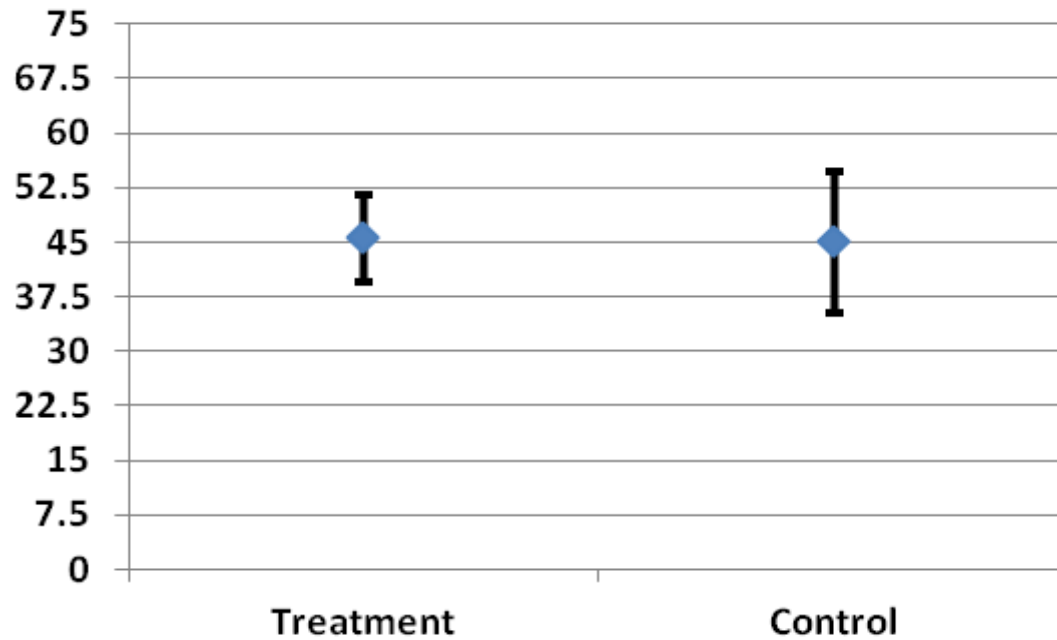
## Margins of Safety Maintained



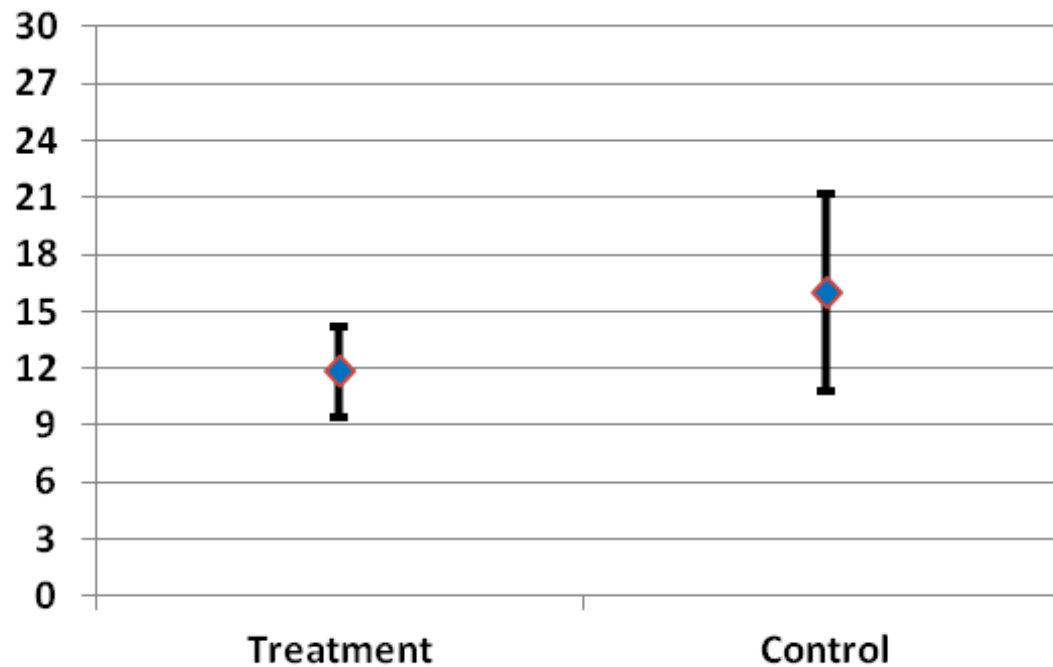


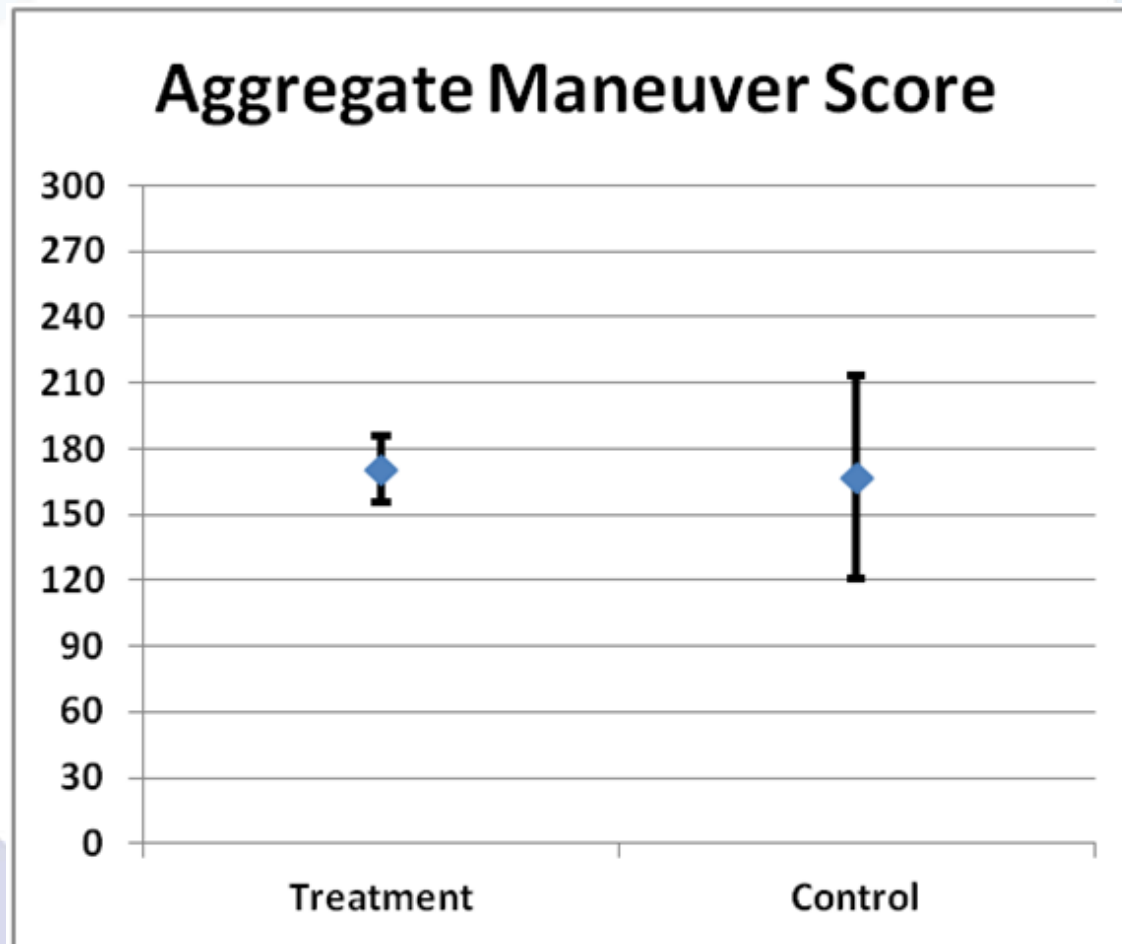


## Use of Rudder, Propulsion, and Tugs



## Anticipates & Evaluates Ship Responsiveness





# Insight, Not Numbers

- “Margins of Safety Maintained” and “Standard Commands” Scores Increased
- “Use of Rudder, Propulsion and Tugs” Scores remained constant
- “Anticipates and Evaluates Ship Responsiveness” **declined**
- Aggregate remained constant

***What does this mean?***

Not Negative Results,  
But Critical Results

***We cannot use an  
intermediate shiphandling  
trainer that does not  
accurately reflect the  
physics of the trainee's ship.***



## Takeaway

**MOVES students can  
perform critical research  
that can greatly affect the  
future of military M&S –  
use them**

# Contact Info

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